

**ABSTRACT**

Provided are a functionalized, encapsulated fluorescent nanocrystal comprising a liposome having encapsulated therein one or more fluorescent nanocrystals; use of the functionalized, encapsulated fluorescent nanocrystals in detection systems; and a method of producing functionalized, encapsulated fluorescent nanocrystals. A method of using the functionalized encapsulated fluorescent nanocrystals having affinity molecule bound thereto comprises contacting the functionalized encapsulated fluorescent nanocrystals with a sample so that complexes are formed between the functionalized encapsulated fluorescent nanocrystals and substrate for which the affinity molecule has binding specificity, if the substrate is present; exposing the complexes in the detection system to an excitation light source, and detecting a fluorescence peak emitted from the complexes, if present.